

Applied Safety Solutions

Machine Safety Services



Risk assessments, risk reduction planning and project services allow companies to plan and implement safety programs for machine safeguarding applications to help reduce costs, improve compliance and enhance plant floor safety.

Description

Rockwell Automation's Machine Safety Services include consulting, system integration and long-term support services for machines that must meet standards set forth by OSHA and ANSI in the United States. These services complement Rockwell Automation's expertise in metalforming and automation projects, including over 15 years of experience in automating mechanical and hydraulic stamping presses.

Rockwell Automation's Machine Safety Services include:

- Standards Training
 - Customer training on current standards and industry accepted interpretations.
 - Standards updates as necessary.
- Risk Assessment and Risk Reduction Planning
 - Coach/train client through procedures of risk assessment.
 - Provide assistance with interpretation of standards and documentation of assessments.
 - Facilitate an iterative process of mitigating each identified hazard by redesign or additional measures.
- Technical Specification Development
 - Assist in the development of a machine safety standard that addresses safety solutions for an entire company, facility or machine.
- Conformity Audits
 - Machine audits to verify and document compliance. A complete step-by-step assessment determines which standards are applicable and whether or not they have been satisfied.

- Stop Time Measurements and Safety Distance Calculations
 - Assure compliancy of light curtain and area guarding device installations.
 - Help determine ergonomic and operational advantages of safeguarding options.
- Safety Circuit Design
 - Including limited and sequential shutdown and applications.
- Probability of Failure on Demand Calculations
 - Help assure a system architecture can obtain a desired Safety Integrity Level (SIL) based on IEC 61508.

The implementation of a comprehensive machine safety program will involve many disciplines. Only Rockwell Automation has the entire spectrum covered. From the design and integration of safety critical circuits using the most advanced controls to the implementation of hard guarding, Rockwell Automation has the experience necessary to fulfill all your needs.

Typical machine system integration services can include:

- System Integration Services
 - Project management
 - System architecture design
 - Panel design
 - Material procurement
 - RA products
 - Third party products (including hard guarding solutions)
 - Assembly
 - Software development
 - Hardware/software integration testing
 - Factory acceptance
 - Start-up assistance

Rockwell Automation's support and follow through are available at every stage to handle any situations that may arise. Our long term support services include:

- On-Site Training
 - Maintenance and operator training for our installed machine safety solutions
- Preventive Maintenance Programs
 - Verify that installed safety systems are operating within defined parameters.
- Field Service
 - Field work to be done on a contractual or as needed basis.





Description

Rockwell Automation advanced burner management systems are pre-engineered to provide ignitor (pilot) and main flame detection, as well as control and monitoring of burner start-up and shutdown sequences including master fuel trip and purge.

The systems can help you:

- Protect against damage to your combustion process equipment and surrounding areas due to explosion or other undesirable event
- Qualify for lower insurance premiums resulting from compliance with applicable industry standards such as NFPA, IRI and FM
- Reduce installation times because our systems are fully assembled, completely programmed and thoroughly tested—designed for immediate field installation
- Simplify unit operation through alarm management and operator displays.
- Reduce start-up time with advanced diagnostics and operator help messages.
- Reduce critical troubleshooting time through the use of pinpoint diagnostic messaging
- Enhance communication and reporting capabilities to other systems in your facility

Our BurnerMaster™ family of burner management systems are designed for single burner (BurnerMaster SB™) or multi-burner applications for boilers, process heaters, furnaces, kilns and any other fuel-burning processes.

In addition to our family of burner management systems, Rockwell Automation offers related systems for control of combustion related processing including:

- Combustion temperature/pressure control
- Fuel handling systems
- Ash handling and emission control systems
- Soot blowing
- Water treatment (related to powerhouse)



Keep your combustion process safe and minimize fuel usage on the same platform!

Applied Safety Solutions

Press Control Systems

Description

Rockwell Automation offers various systems, bundled packages, and kits for meeting the safety-related control standards for the clutch/brake of mechanical stamping presses. These solutions are designed to meet the safety requirements of ANSI B11.1, OSHA 1910.217, CAN/CSA Z142-M90, IEC-61508, EN-954 and EN-692.

The *6556 Clutch/Brake kits* are bundled packages consisting of redundant PLC components with application software, wiring diagrams, relays and documentation. Some packages have TUV certification. Each solution is designed with independent redundant programmable controllers with additional electromechanical components and the application software to provide the necessary monitoring, self testing, security, and verification that make up a control-reliable design.

The *PLC-5/x6 based kits* come with the clutch/brake software secured in program file #16, and the user can add other logic to other files. The PLC-5-based kits are designed for large presses with extensive automation.

The *fixed SLC and MicroLogix kits* are pre-programmed with the ladder program locked in flash memory. Certain features in the fixed kits are configurable. The MicroLogix and SLC 5/02 kits provide only the basic clutch/brake functions. The SLC 5/03-based Omega kit, for example, has a variety of standard features to control ancillary functions such as lube and programmable limit switch that can be configured through optional pre-programmed PanelView screens. The fixed kits are easy to use, require no programming, and are designed for small to medium-size presses retrofitted by the user.

The *StamPro™ system* is a complete, ready-to-install, Logix-based press control system that comes with controllers and hardware for controlling a stamping press. Ancillary control functions, which can be purchased from Rockwell Automation or supplied by the user, are integrated into the system hardware and software designs. The StamPro system is designed for end users, OEMs and integrators. The system can be purchased either with pre-programmed optional functions or can be programmed by the user.

Some press functions which can be integrated with our solutions include:

- **Clutch/Brake.** The Allen-Bradley controller designed system that controls the dual-valve clutch/brake mechanism as found on all mechanical stamping presses. This system includes dual redundant controllers with application software for monitoring and self-testing to achieve safety regulation compliance.
- **Programmable Limit Switch (PLS).** Ladder Logic for switching outputs according to crankshaft position. The PLS is often used to integrate and synchronize other press auxiliary functions such as feeders, grippers, blow-off and ejector valves. This feature requires a resolver position input for accuracy. The PLS is usually pre-programmed and configured by the user for each job or die.
- **Die Monitoring.** Logic that monitors a variety of in-die sensors to determine misalignment, double blanks, misfeeds, part positioning, plus other critical conditions. The die monitor function requires a resolver input and is generally pre-programmed and configured for each job or tool.

Modes of Operation

The following table lists the modes of operation for each Rockwell Automation press control solution.

Press Modes of Operation	Micro-Logix (6556-MLCBK)	SLC 5/02 Fixed (6556-SCBK2)	SLC Omega (6556-SCBK3)	Compact Press Master ^①	StamPro System ^①
Off	X	X	X	X	X
Inch	X	X	X	X	X
Micro inch	X			X	X
Single	X	X	X	X	X
Continuous	X	X	X	X	X
Remote & Auto Single					X

① Contact your local sales office for pricing and order information.

Press Features/Functions

The table below summarizes the various press control functions available for each press control solution.

(S = Standard, O = Optional, P = User Programmable, Blank table cell = Function not available).

Press Control Features	Micro-Logix	Compact Press Master	SLC 5/02	SLC Omega	Stam-Pro
Clutch/Brake Control	S	S	S	S	S
Operator Interface	O	S	O	S	S
E-Stop & MCR Relays	S	S	S	S	S
Run Sta. Monitored	1	1	1	1	4+
Main Motor Control	O	S		S	S
RCLS Position Capable	S	S	S	S	O/P
Resolver Capable	O	S		O	S
Brake Time Monitor	O	S		S	S
Var. Speed Top Stop		O		S	O
Production Counters	O	S		S	S
Maintenance Timers	O	S		S	S
Prog. Limit Switch		S		S	O
Die Protection Mon.		O		S	O
Recipe Storage				20	30+
Var. Speed Comp.		O		S	S
Lubrication Control	O	S		S	O/P
Tonnage Monitoring				O	O/P
Auto Counterbalance		O		O	O/P
Shut Height Adjust		O		O	O/P
Var. Speed Drive Interf.				O	O/P
Servo Feed Interface					O/P
Robot Interface					O/P
Coil Feed Interface					O/P
Die Cushion Control					O/P
Die Clamp Control					O/P
Bolster/Die Cart Cntl.					O/P
Automation Control					O/P
Aux. Automation Infrf.	S	S	O		S
Prod. Monitoring/OEE					O/P
Hydrlc. Overload Cntl.		O			O/P
Light Curtain Interface	S	S			S
Disconnect/Starters	O	S		O	S
Colour HMI		O		O	S
Open Net. Interface Capable ^②	O	O		O	S
TUV Certification	S				
User Prog. Capable					S
Enclosure assembled	O	S	O	O	S
Complete System	O	S	O	O	S

② Ethernet, DeviceNet, ControlNet, RS232

Reduce operating costs and downtime with reliable, flexible programmable press controls.

The Rockwell Automation StamPro™ System is an advanced programmable controller-based system used for the control and monitoring of mechanical and hydraulic stamping presses. The StamPro control system is for customers who want to reduce cost and risk by purchasing a complete pre-engineered system, ready for installation.

System Description

The StamPro System is a flexible, pre-engineered press control system based on standard Rockwell Automation components available locally and supported worldwide. StamPro Systems provide press control, operator interface, and magnetics in an integrated package with a complete set of documentation. The use of field-proven hardware and software helps users minimize cost, risk, and comply with the necessary ANSI, OSHA and CSA standards.

System Architecture

The StamPro System uses the Allen-Bradley Logix family of processors. The safety kernel, executed in dual Logix processors, is based on standard Bulletin 6556 clutch/brake or ram control software, designed by Rockwell Automation to comply with ANSI B11.1/B11.2, OSHA 1910.217, CSAZ142-2002, and EN 954. This safety kernel is coupled with optional application software that provides all other press automation control, monitoring, information and network requirements. The Logix programming environment allows the user to add their own additional custom software into the same processors where the safety kernel resides, to minimize control hardware costs. The standard operator interface is a pre-programmed colour PanelView 1000 (key pad or touch screen). The system is available in a freestanding console or an upright enclosure with a press mounted operator station.

Features

The StamPro System is modular, which allows each system to be configured to the requirements of each specific application, and easily accommodates control expansion for future needs.

Standard features include:

- Stop time monitoring for hands in die
- Safety Interlocks and Light Curtain interface
- Main Motor/Pump Control, including a reversing motor starter
- Lubrication control, including a motor starter
- Manual Slide Adjust/ Ram Profile Control
- A 10 inch color operator interface terminal with Alarm Status/History and Fault/Prompt
- Clutch/Brake Safety Control
- Interface for four run stations with anti-tiedown protection
- Fully assembled and mounted in a NEMA 12 rated industrial enclosure with one set of operator run palm-buttons

Optional features include:

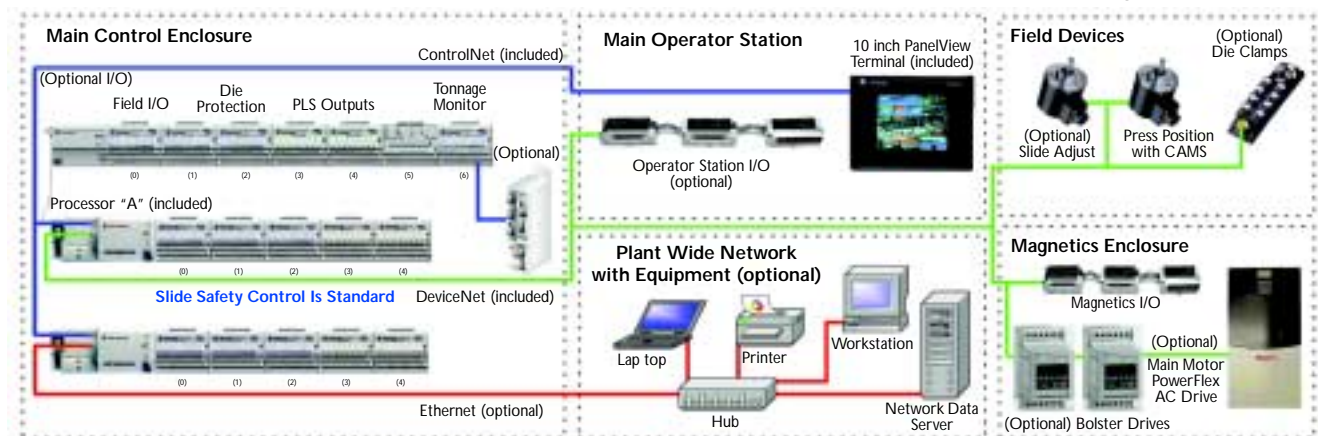
- Automatic Slide Adjust Control
- Die Protection Monitoring
- Programmable Limit Switch
- Tonnage Monitoring
- Die Clamp Control
- Die Cushion Control
- Bolster Control
- Light Curtain with muting
- Hydraulic Overload Control
- Recipe Management
- Automatic Die Change
- Automatic Counterbalance Air Pressure Control

Results

A StamPro System will help provide:

- Reduced downtime through comprehensive operator diagnostic messages, on-line control system troubleshooting and replaceable modular components available worldwide.
- Increased flexibility through open integration of press control functions and industry-standard connectivity to other equipment including coil feeds, computers, drives, robots and servo transfer feeds.
- Improved quality through recipe-based control of process parameters such as shut height, counterbalance air pressure, motor speed, die protection and programmable limit switch.
- Reduced costs through the use of standard Rockwell Automation industrial control hardware, field-proven application software, and a comprehensive documentation package.

StamPro Architecture



Press Control Systems

FeederPro™—A Logix™ Based Press Coil Feed Engineered Solution

Helping stampers improve uncoiling, straightening and feeding to make better parts.

As manufacturers demand higher quality components from their suppliers, handling of raw material feed stock becomes critical. In the stamping process, that means feeding the coil into the press has to be accomplished with greater emphasis on:

- Speed
- Flexibility of coil sizes
- Faster change over
- Minimal impact to the material

Rockwell Automation has developed a pre-engineered automated press feed control system to help increase productivity and reduce the high costs of scrap in the stamping room.

Rockwell Automation's FeederPro is available in a range of configurations, from a pre-engineered bundle of hardware for small press feeds to turnkey systems for the largest flat metal line processing systems.

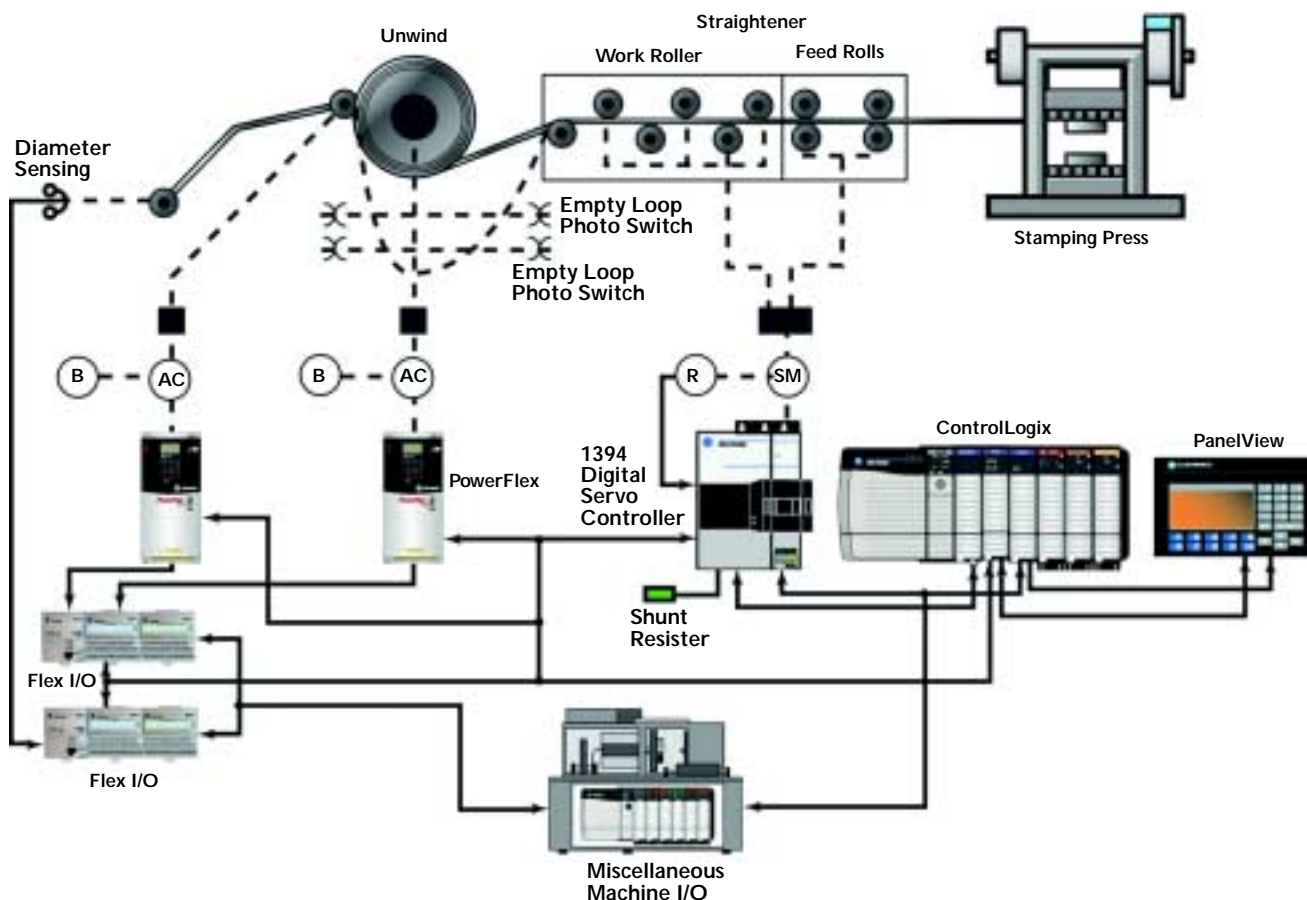
Reliability Is Designed into the Solution

The Rockwell Automation FeederPro system provides a reliable solution for press feeders based upon standard, off-the-shelf Allen-Bradley components. The system provides a press feed controller that uses familiar configuration and troubleshooting tools on the Logix™ family of controllers. Built-in set-up routines and diagnostics make the FeederPro easy for your press room operators and maintenance personnel to run and troubleshoot the system by themselves, maximizing their productivity and reducing the downtime of the feeder system. The FeederPro application software provides the commands to the drives. This enables the system to closely follow the motions of the press for tight control of the manufacturing process.

Results—A Smooth Operator

The FeederPro system uses the Rockwell Automation SmoothProfile™ press feed profile to smoothly accelerate and decelerate the feed rolls. This approach dramatically reduces roll slippage and virtually eliminates material marking. The FeederPro system is available as a pre-engineered bundle of engineering and components or as a completely assembled and tested control system.

The open network architecture of the FeederPro System allows for simple connectivity to a StamPro press control, for even better control of your stamping process.



Make parts faster by replacing mechanically-driven transfer system with press control, feed control and servo transfer control on a common platform.

Global manufacturers are striving to create more flexible and productive manufacturing facilities. In many stamping rooms, this is being accomplished through the use of servo-driven, rather than mechanically driven, inside the press part transfer systems. Servo Transfer Feed (STF) systems deliver increased flexibility and improved productivity by allowing users to configure the paths of their transfer systems. Rockwell Automation offers a variety of STFPro systems for customers.

The Logix Solution

Manufacturers who use the Logix family of controllers want to run their presses with one neatly integrated system for both their press controls and their STF functions. This split dramatically simplifies the overall system architecture, operation, and maintenance.

The ControlLogix system has a commercial off the shelf architecture, freeing stampers from “black box” controllers that are difficult to maintain and troubleshoot. The STFPro system implements the motion control application using easy to understand software. This open approach enables a wide range of personnel to understand and troubleshoot the system.

Servo Transfer Feed Functionality

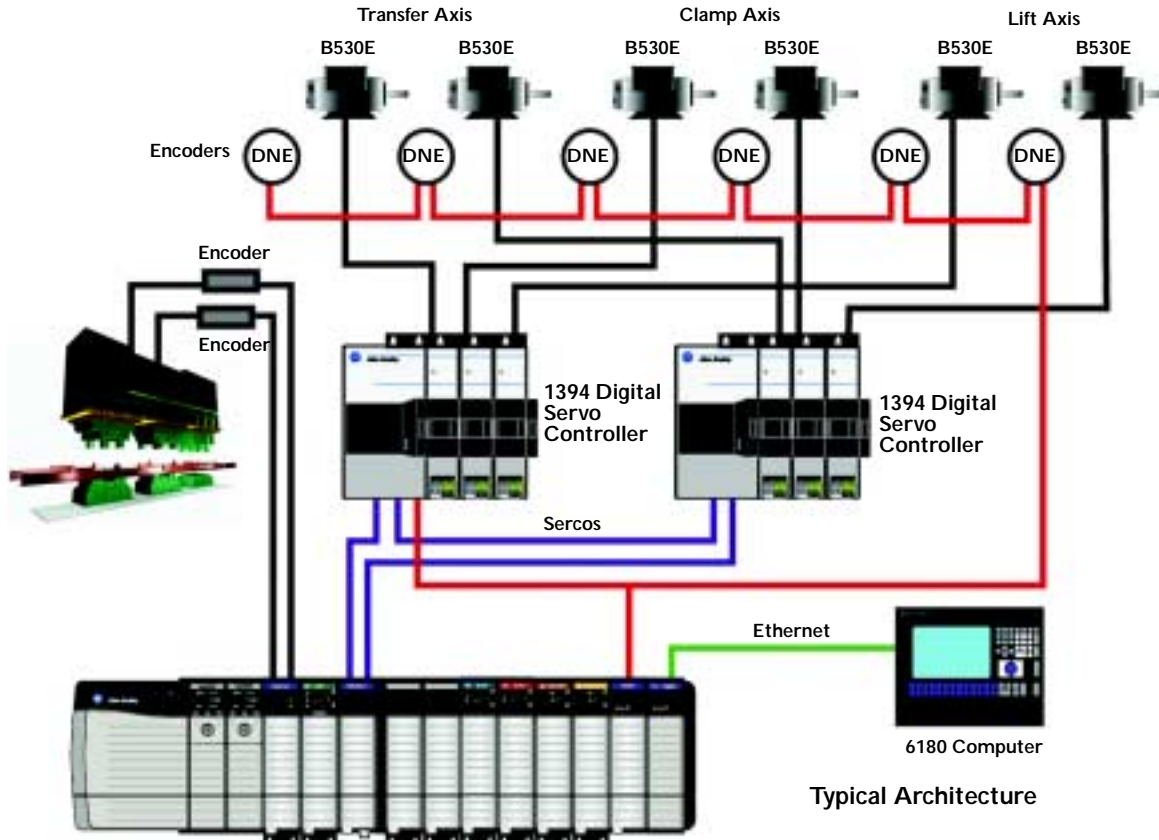
The STFPro application software provides the commands to the drives that enable the system to closely follow the motions of the press machine, for tight control of the manufacturing process.

Proven Solutions Get Results

Rockwell Automation has applied extensive expertise in Servo Transfer Feed systems to develop the hardware/software products users need to efficiently and reliably operate their complex machines. Routines for building a SmoothProfile™ motion cam are standard with Rockwell Automation's STFPro software. The result is highly repeatable parts transfer with minimum machine wear. The demonstrated success of this software shortens system development time and reduces the risks associated with developing an application from scratch.

The use of standardized, well-documented software also helps make STFPro systems more easily supported in the field, resulting in improved up time and reduced training costs. The well-designed hardware solution ensures that all the electrical design details are documented. Rockwell Automation's proven STFPro system is available as a hardware/software bundle or included in a complete turnkey system for both OEMs and end users.

The open network architecture of the STFPro System allows for simple connectivity to a StamPro press control, for even better control of your stamping process.



Press Control Systems

Compact PressMaster™—A MicroLogix™ Based Complete Mechanical Press Control Solution

Reduce operating costs and downtime with reliable and flexible MicroLogix press controls.

The Rockwell Automation Compact PressMaster System is a cost competitive, programmable controller-based system used for the control and monitoring of mechanical stamping presses. Reduce cost and risk by purchasing a complete system, pre-wired and tested, ready for installation. The system is designed to modernize your press controls, increase control system reliability, and reduce downtime by providing comprehensive operator diagnostics. Compact PressMaster provides press users, rebuilders, and OEMs a low cost PLC based control system to remain competitive and reduce risk.

System Description

The Compact PressMaster System is an expandable press control system based on standard Rockwell Automation components available locally and supported worldwide. Compact PressMaster Systems provide press control, operator interface with comprehensive diagnostics, expandability, and motor controls in a single integrated package. The system is provided, ready to install, with a complete set of documentation.

The Compact PressMaster System is based on a Bulletin 6556 clutch/brake control with dual processors and software designed by Rockwell Automation to help customers comply with ANSI B11.1, OSHA 1910.217, CSA Z142-2002, and EN 954. Allen-Bradley motor controls and an Allen-Bradley PanelView 3" monochrome operator interface with key pad is included, to complete the system and provide maximum reliability.



Standard Features

- Safety Interlocks and Light Curtain Interface
- Clutch/Brake Safety Control with Inch, Single Stroke, Continuous, Modes of Operation, including a mode select key switch
- Main Motor Control, including a 25 Hp reversing motor starter and forward/stop/reverse push-button
- Lubrication Control, including a 1 Hp motor starter and lube verification
- 60 Amp/460V Lockable Power Disconnect
- Press Mountable, NEMA 12 Rated Industrial Enclosure
- Operator Fault and Prompt Messages, Alarm Status Operator Screen on a 3 inch PanelView Display
- One Industrial Brushless Absolute
- Brake Time Monitoring and 90 Degree Stop Test
- Interface for One Run Station with Anti-Tiedown Protection
- Press Stroking Anti-Repeat and Top Stop Overrun Protection
- Clutch/Brake and Counterbalance Air Pressure Monitoring
- User Immediate and Top Stop Control Interlocks
- 4 Programmable Limit Switch Outputs
- Production counters and maintenance timers

Optional Features

- Manual or automatic slide adjust
- 8 Channels of Die Protection
- 8 Programmable Limit Switch Outputs
- Hydraulic Overload Control
- Light Curtains with muting
- OEM packages
- Automatic counterbalance control
- Variable speed compensation
- 6 inch colour operator display terminal

Results

A Compact PressMaster System helps provide:

- Reduced downtime through advanced diagnostic messages, helpful operator prompts, and on-line control system troubleshooting.
- Improved system reliability through the use of standard Rockwell Automation industrial control hardware and software.
- Increased operational flexibility and expandability, while reducing costs and risk.
- Compliance with ANSI, OSHA, and CSA regulations.
- A press control that can grow with your stamping operations.

Ordering Information

Contact your local Rockwell Automation Sales office or distributor.

	Catalogue Number
Base System	6556-GCPM
Dual Absolute Encoder Option	6556-GMRP2
Die Protection Monitoring Option	6556-GCDP1
4 Additional PLS Outputs Option	6556-GCPLS1
One Operator Run Stand	6556-GTSTAND
6 Inch Color Operator Display Option	6556-GCPV600
Dual Absolute Encoder Option with Light Curtain Muting	6556-GCMUTE



Description

A MicroLogix 1500 processor-based Clutch/Brake Package is a bundle of hardware, software, and documentation that controls the basic clutch/brake mechanisms on mechanical stamping presses. This package requires no user programming. It can be interfaced with other controllers such as the ControlLogix system.

The package uses redundant MicroLogix 1500 processors with application software for self testing and verification to help meet the safety requirements of ANSI B11.1, OSHA 1910.217 and CAN/CSA Z142-M90 press safety regulations for mechanical stamping presses. The DC version has TUV certification for IEC-61508, EN-954, EN-692 and DIN 19250. Each MicroLogix 1500 processor has the basic clutch/brake functionality as well as the basic diagnostics to interface to several display options making it an easy-to-use cost-effective solution for small presses. Since you don't need programmable controller experience; you can just wire and mount the equipment.

For other press functions such as programmable limit switch, automation control, brake time monitoring, die protection monitoring, resolver based consider using the Compact PressMaster system. If you require resolvers and brake time monitor only, add the 6556-GMRP1 option. If you require more automation flexibility or need a custom system, consider using the StamPro system.

Control Features

- One set of Run buttons monitored
- One set of Inch buttons monitored
- AC and DC versions
- Hard wired cross-checking
- Open communication for diagnostics
- Modes of operation:
 - – Off
 - Inch
 - Micro Inch
 - Single
 - Continuous (Armed)
- Brake monitoring
- Top stop overrun and anti-repeat protection

System Requirements

- Rotary Cam Limit Switch
- Motion detection device
- Self-checking valve

Ordering Information

The purchase of one kit includes the license to use this control on one stamping press.

Network options must be ordered separately. Options include the DeviceNet network (catalogue number **1761-NET-DNI**) and the RS-232-C/DH-485 Advanced Interface Converter (catalogue number **1761-NET-AIC**).

The MMI option, which must be ordered separately from the basic Clutch/Brake package, includes pre loaded software and cables (catalogue numbers **6556-GMPV300**).

The 6556 clutch/brake control package also comes in two versions:

Package with 120V AC I/O (catalogue number **6556-MLCBK**)

- MicroLogix 1500, 1764-LSP (2)
- Output Module, 1769-OW8I (4)
- Memory Module, 1764-MMIRTC (2)
- Terminator cap, 1769-ECR (2)
- DC base unit, 1764-28BXB (2)
- Relay, 700CF310D (4)
- AC Input Module, 1769-IA16 (2)
- Safety Relay, 700ZBR520AZ1 (1)
- AC Input Module, 1769-IA8I (4)

Package with 24V DC I/O (catalogue number **6556-MLCBKDC**)

- MicroLogix 1500, 1764-LSP (2)
- Output Module, 1769-OW8I (4)
- Memory Module, 1764-MMIRTC (2)
- Terminator cap, 1769-ECR (2)
- DC base unit, 1764-28BXB (2)
- Relay, 700CF310ZJ (4)
- DC Input Module, 1769-IQ16 (6)
- Safety Relay, 700ZBR520AZ1 (1)

New—Enhanced Options for MicroLogix Clutch/Brake Controllers

Reference #	Option Description
6556-GM4RUN	Interface for 4 run stations + software
6556-GMPV300	Display-3" LCD PanelView300 Micro+cable+software
6556-GMRP1	1 Encoder and an existing user supplied CAM box with Brake Time Logic + software
6556-GMRP2	2 Encoders and no CAMS needed with Brake Time Logic + software
6556-GMMD5	Motion Detect Device and cable
6556-GTSTAND	One operator run station on T-Stand with run, top stop, and e-stop push-buttons
6556-GCAM1	6 CAM box with Integral Motion Detect Device
6556-GCAM2	6 CAM box without Integral Motion Detect Device
6556-GCAM6	3 CAM box with Integral Motion Detect Device and ability to mount 6556-GMRP1 inside

Press Control Systems

Omega™—An SLC500 Based Press Control Solution

Description

The Omega™ Configurable Press Control Kit is designed to control basic functions on mechanical stamping presses and to meet the safety requirements of ANSI B11.1, OSHA 1910.217 and CAN/CSA Z142–M90 press safety regulations for mechanical stamping presses. The system comes as a bundled package consisting of hardware, all application software, and documentation.

Configurable features include tonnage monitoring, shut height adjustment, PLS, lubrication, die monitor, automatic counterbalance, and servo feeds. All configurable features require that you add resolver modules to the control system. For instance, you can add a tonnage monitoring module or a resolver from one of our Encompass partners. For more information, refer to the Encompass Program Product Directory, publication 6873.

Functional Design

The Omega Press Control System provides basic clutch/brake control as well as press control. No user programming is required.

Mechanical Design

The control system includes redundant SLC 5/03 processors with application software for self testing and verification to conform with ANSI and OSHA regulations.

Both SLC 5/03 processors are located in separate chassis. They monitor all clutch/brake I/O and exchange information about machine status. They are linked so that if one processor detects a condition different from that detected by the other, its control logic is designed to declare a fault and turn off all outputs to press valves. The other processor is designed to do the same.

Features

Clutch/Brake Control is the standard logic used in all Rockwell Automation Omega series press control systems. Clutch/Brake Control features are:

- One set of Run buttons monitored
- One set of Inch buttons monitored
- Modes of Operation
 - Off
 - Inch
 - Single
 - Continuous
- One Resolver (required, not supplied)
- One Resolver or Rotary Cam (required, not supplied) for second position device
- Clutch/brake time monitor

Other standard control features include:

- Production monitor and counters
- Die monitoring (16 channels)
- Programmable Limit Switch (8 channels)
- Recipe Storage (20 die recipes)
- Maintenance Timers
- Multi-function lube control
- Main Motor Control

Ordering Information

The purchase of one kit includes the license to use this control on one stamping press.

See below for 6556 catalog numbers to order.

The MMI must be ordered separately [PanelView 600 (catalogue number 6556–SPV600) configuration screens are burned in flash.] Resolvers and resolver modules must be ordered separately.

Hardware Included	For 6556–SCBK3 (AC version)	For 6556–SCBK3DC (DC version)	Hardware That You Provide
SLC 5/03 Processor (2)	1747–L532	1747–L532	Input Switches and Run Stations (application dependent)
Link Coupler (DH–485) (2)	1747–AIC	1747–AIC	Rotary Cam Limit Switch (1, if used)
Power Supply (2)	1746–P2	1746–P2	Resolver (minimum of 1)
7-slot I/O chassis (1)	1746–A7	1746–A7	Resolver Input Module (minimum of 1)
10-slot I/O chassis (1)	1746–A10	1746–A10	Solenoid Valves (4) with internal fault detection
Input Module (4)	1746–IA16 (AC)	1746–IB16 (DC)	Operator Interface (1) colour PanelView 600 (6556–SPV600)
Input Module (1)	1746–ITV16	1746–ITV16	Tonnage Module (optional, 2 maximum)
Output Module (2)	1746–OA16	1746–OB16	Analog I/O Module (1, optional)
Relay Output Module (2)	1746–OX8	1746–OX8	Sensors for die monitoring
Relays (4)	700–P400A1	700DC–F310Z24	

Reference Number	Option Description
6556–GSRP1	1 Resolver and an existing user supplied CAM box with Brake Time Logic + software
6556–GSRP2	2 Resolvers and no CAMS needed with Brake Time Logic + software
6556–GSMDS	Motion Detect Switch, device and cable
1746–NIO4V	Auto Counterbalance Control, Shut Height Position Monitor, Variable Speed Main Drive Control
6556–GTSTAND	One operator run station on T-Stand with run, top stop, and e-stop push-buttons
6556–GCAM3	3 CAM box with Integral Motion Detect Device
6556–GCAM5	3 CAM box without Integral Motion Detect Device